Community Assistance Grants Program

Massachusetts Coastal Zone Management

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Commonwealth of Massachusetts

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Introduction

This publication documents the results of the first three rounds of Massachusetts Coastal Zone Management's (CZM) Community Assistance Program, a financial aid program for coastal cities and towns.

From its earliest days, Massachusetts CZM was conceived as a partnership between state and local government. Thousands of citizens and officials participated in the development of a policy setting coastal plan. One element of the CZM plan called for the establishment of the Community Assistance Program. This publication describes the meaning and impact of the 42 grants given to 37 coastal cities and towns in 1978 and 1979. Additional projects have been funded in subsequent rounds of grants, and several are touched on briefly.

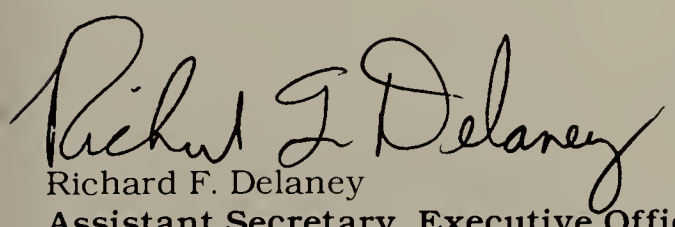
Massachusetts' magnificant shoreline stretches for some 1500 miles over a diverse resource of developed and undeveloped land. This diversity, and the different needs felt by various cities and towns, is reflected in the breadth and variety of project descriptions contained in this publication. Some projects had major port and harbor development as their goal, while others sought more information on the natural processes at work on a particular part of the shore. The grants awarded fall into one of several categories: port and harbor development and waterfront renewal plans, preliminary engineering studies, applied science investigations, recreation plans, and coastal hazard (e.g., erosion and flooding) mitigation studies. Several communities received special federal CZM funding for urban waterfront development plans.

This publication meets many needs. It documents past studies and shows what steps communities have taken to implement study recommendations and conclusions. It serves as a brief history of recent improvements in local coastal management. It demonstrates the type and extent of success possible with small grants and much local interest in solving problems and building toward the future.

This documentation meets educational goals. It serves to transfer information and ideas from one community to another. It is hoped that communities with similar problems or needs will share relevant results and experience. Keep in mind, however, that individual project descriptions are brief summaries of lengthy plans and reports. Copies of full reports are available at the CZM office in Boston and at respective city or town halls. For more in-depth information, review the complete study.

In addition to the grants program, the CZM office maintains an experienced technical assistance team which assists communities and individuals in solving coastal problems effectively. The team consists of coastal geologists, an environmental engineer, biologists, lawyers, and planners. If these specialties might prove useful to a town or city, contact the regional coordinator to arrange for their services.

The Massachusetts coastal zone is a diverse and abundant resource able to meet a multitude of development, recreation, and conservation needs. Every community has unique needs and demands. The Community Assistance Program was designed to be flexible and sensitive to local needs and conditions. The success of coastal zone management in the Commonwealth rests upon a strong partnership of state and local government. It is hoped that the CZM Community Assistance Program has contributed to this important relationship.



Richard F. Delaney
Assistant Secretary, Executive Office of Environmental Affairs
Director, Massachusetts Coastal Zone Management

Special note from the Community Grants Administrator:

Massachusetts CZM has a commitment to balanced growth, development and preservation of coastal resources. The grants program reflects this commitment. Projects cover a wide gamet from port, harbor and housing development, to wetlands and barrier beach preservation. The grants program has encouraged full and varied utilization of coastal resources.

The grants program has contributed to better LOCAL coastal management. CZM funded well conceived projects that had clearly stated problems or goals, and that had a practical orientation. For the most part, reports did not end up on planning board, selectmen and library shelves, but were instead the stimulus for further action. Look at this particular list of accomplishments:

- The St. Peters Square Plaza has been constructed in Gloucester.
- Harwich has rebuilt the commercial fish pier.
- Beverly is putting in a new town landing.
- A solar-assisted shellfish hatchery has been constructed on Martha's Vineyard.
- Trails are currently being cut to improve access and use of the Bass Hole Recreation Area in Yarmouth.

And the list goes on. CZM did not initiate these ideas; they were priority projects of local communities. CZM helped communities to realize local dreams and ideas by providing the seed money necessary to move from the idea or plan stage to implementation.

The program also proves that a small amount of money can go a long way. Sometimes, a community only needs $10,000 to complete a project; at other times, the small amount of CZM monies helped a community leverage larger sums. On an initial public investment of $230,000 (the sum of the first round of grants), more than $10 million in development occurred.

The success of the Community Assistance Grants Program rests with involved local citizens, forward thinking community leaders, and a state CZM program that had clearly stated goals and directions, and a desire to encourage and assist communities as they pursued better coastal management. The success reflects a positive cooperative spirit between state and local government. All of the people involved in the grants program should feel the mutual satisfaction of success. All of our labors proved fruitful.

Sincerely,

Louis A. Elisa
Contracts and Grants Administrator
Massachusetts Coastal Zone Management

GLOUCESTER: A Harbor for Many Uses

The city of Gloucester is the oldest and largest commercial fishing port in New England. The port handles almost 160 million pounds of fresh and frozen fish annually. Fish processing and packing facilities dot the area around the harbor. More than a fifth of the city's work force is employed in the fishing industry.

Activity in Gloucester's inner harbor is non-stop, a perpetual movement of men, boats, and trucks. Yet, even with all this activity, the inner harbor's facilities are old and crowded, and expanded facilities are urgently needed. Gloucester must upgrade and expand commercial facilities to meet current landing and processing demands.

Industries related to fishing, tourism, and professional services vie for space between and along the waterfront. CZM provided funds to Gloucester to analyze ways to balance diverse and conflicting demands for limited space. The project was initiated by the city's Department of Community Development, along with the city planner. The city hired a planning firm to inventory and analyze land use in the inner harbor. An ad hoc committee on Harbor development was formed to work with the planning consultant.

The planning consultants assessed the economic strength of the harbor for fish and food processing, tourist, manufacturing, and office based industries desiring a harbor location. Extensive base maps were produced identifying all activities in the area. The firm made recommendations for use of specific areas of the harborfront available for development and proposed ways to better manage existing harbor activities. In the course of the consultant's work, local citizens were surveyed for their attitudes and opinions.

The planning consultants concluded that the potential exists for meeting both fishing industry needs and those of other businesses. Signaling a departure from the exclusive use of the harbor for the commercial fishing industry, the study recommended that one of two prime harbor parcels be developed for a facility like a hotel and conference center, specialty shops, and a pedestrian walkway. The planners proposed using this parcel to connect the harbor with the downtown. Preliminary plans to develop the larger parcel, known in Gloucester as the *Head-of-the-Harbor* area, into a new fish processing facility were strengthened through the study.

The consulting planners stressed the need for better management in order to balance the competing interests desiring a waterfront location. They recommended removing dilapidated piers, encouraging private development of commercial fishing docks, and creating an industrial park away from the waterfront.

Much has happened in Gloucester in the past few years. Construction is underway for three fish processing facilities and a storage facility at the Head-of-the-Harbor. Harbor dredging has begun. Numerous proposals for housing and fishing developments along the waterfront have been submitted to the city.

In the future, the attractiveness and vitality of Gloucester's waterfront will continue to serve as a magnet for businesses, tourists, and residents. Studies like this are the building blocks of good decision making and help form the early blueprints for new growth and development.

GLOUCESTER: Revitalizing St. Peter's Square

To millions of Americans, Gloucester, Massachusetts means fish. The bronze statue of the Gloucester fisherman is famous throughout the world. Yet for many of the 400,000 who visit the city as tourists each year, the first waterfront site they saw was a dirt parking lot, not the Gloucester fishing fleet.

This is the St. Peter's Square area, the site of an annual summer festival. The square lies in a cove at the entrance to Gloucester's inner harbor.

In an attempt to improve access to the harbor, as well as to improve the visual qualities of the area, the city of Gloucester sought federal and state assistance to plan and construct an attractive park at the site. CZM provided funding to develop engineering specifications based on the city's architectural plans. This engineering work was required before park construction could be funded by a federal agency.

The park has been built. A central brick piazza highlights the development, providing attractive and usable open space for fishermen, shoppers and tourists. A new raised wharf overlooking the fishing fleet has been constructed. Automobile parking is maintained but hidden by brick work and landscaping. The existing floating pier, used primarily by lobstermen, remains. An attractive walkway of brick and granite, connects St. Peter's Square Park with the downtown shopping district.

Funding construction of the project was not easy, but the city creatively combined local, state and federal government grants to total half-a-million dollars. Final architectural plans and construction costs were modified somewhat after public debate, and construction took place during the winter 1980-81.

The St. Peter's Square project is a good example of hard work and dedication on the part of the Mayor, city officials, and the planning department. Using creative grantsmanship, the city's Office of Community Development (OCD) used a relatively small amount of CZM funding to meet a variety of requirements and to ensure a new park for the city.

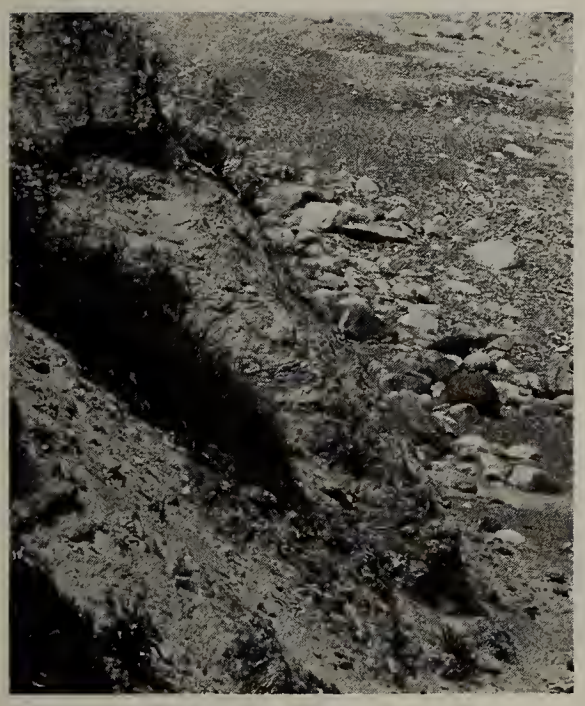
MARBLEHEAD: Understanding Coastal Erosions

The sound of the sea pounding upon the shore lures many people to the coast. However, this inviting sound sometimes indicates the presence of serious erosion. Many of Marblehead's public recreation sites such as Chandler Hovey Park, Fort Sewall, Fort Beach, Devereaux Rocks, and Castle Rock, are rocky and susceptible to erosion. Continuous rockledge and soil erosion now threaten the use of these sites for passive recreation and visual access to the sea.

The Marblehead Planning Board and the Essex County Planning Director decided to investigate storm and erosion damage to these sites as the first step toward their restoration, protection, and maintenance. The town sought CZM funding assistance to perform an analysis of the sites. A coastal engineering firm was hired to do the work.

The engineers prepared a detailed analysis of each site, and documented a long history of erosion and storm damage in Marblehead. Current erosion rates reach up to four feet annually in some areas of the coast.

The engineering consultants developed designs and specifications to address erosion problems. Specific recommendations called for repairing or building seawalls and revetments to retard erosion at the rocky sites, and non-structural solutions for dealing with erosion at the beach sites. They also developed a methodology for predicting the



potential damage from erosion at the sites. Finally, they outlined the permit applications and procedures the town would need to follow before receiving approval to implement the recommendations.

The town began implementing parts of the report in 1981. Improvements have been completed at three sites. Other projects are underway. The town's goal of maintaining its lovely vistas and access points to the sea will not be lost.

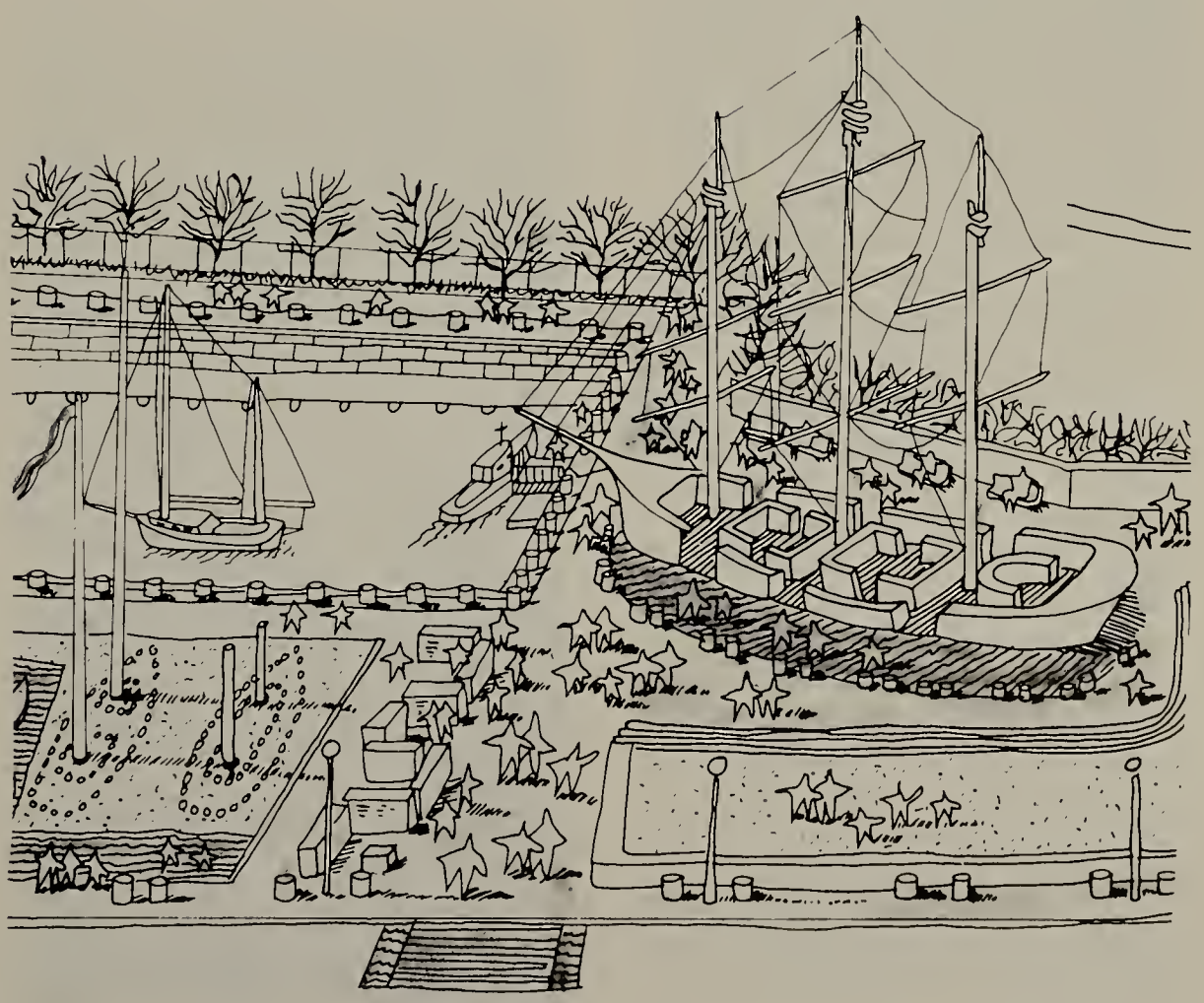
SALEM: Looking to the Future

When planners, architects, and urbanophiles from across the country discuss wonderfully revitalized cities, Salem is a topic of conversation. By sensitively and aesthetically recalling its past, Salem has prepared itself for the late 20th century. The city has rediscovered its extraordinary rich 350 year history.

Downtown business and historic wharf areas have been revitalized, and on ongoing rehabilitation of old buildings and the construction of new ones all contribute to Salem's present prosperity and beauty. This has been accomplished as a result of effective cooperation between private developers and governments.

Between the revitalized downtown and wharf areas is another Salem: South River waterfront. Once the location of a busy harbor during Salem's heyday of clipper ships and China Trade around the turn of the 18th century, South River today is a shallow 800-foot channel braced by still sturdy granite block bulkheads. Only two lobstermen currently operate from the channel. Land surrounding the channel has deteriorated and is underutilized. It contains inaccessible vacant land, and a strip of commercial development not dependent on a river location. Dense commercial and residential areas adjoin the site.

The city envisioned this 6.5 acre South River area as the next area for community redevelopment, and obtained a CZM grant to examine how the South River site could best be developed to



accommodate historical, recreational, commercial, and marine concerns. A landscape architectural firm was hired, and through intensive participatory work sessions with city agencies, businesses and citizens, a plan for this site was developed.

The plan proposed opening up the waterfront by relocating businesses, and rehabilitating buildings. In addition, plans called for creation of an access belt along the channel, construction of a playground and walkway for the adjacent neighborhood, development of a public marina, river dredging, and bulkhead repair. Bricked walkways would connect the development, called Nathaniel Bowditch Park, to the downtown.

According to city planner Michael Moniz, the city has begun to implement the plans. The south side of the site will be developed as a playground area and corner gateway. Marina development and building rehabilitation for new stores will come next. The north side of the channel has been set aside for housing; development plans are currently being prepared.

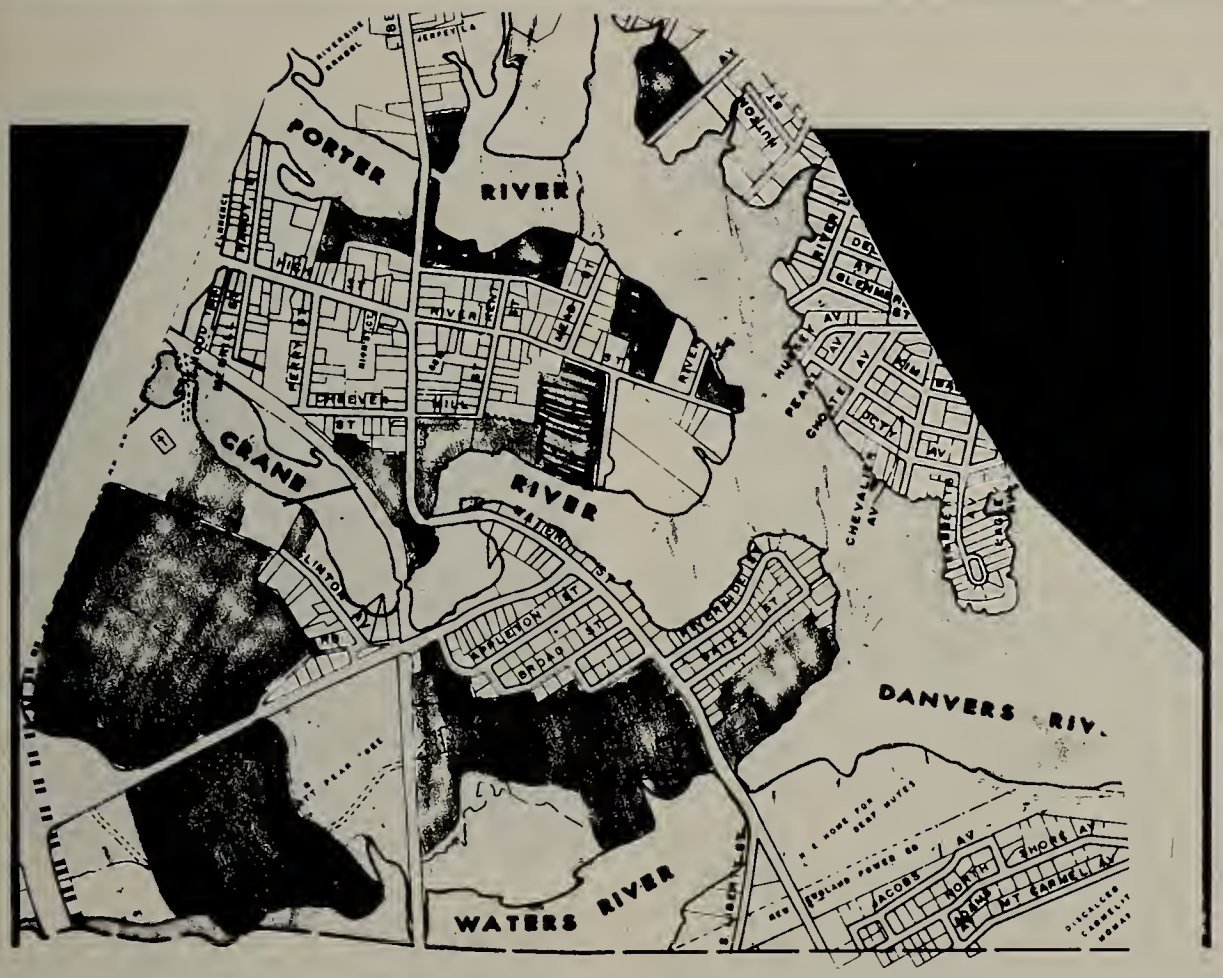
The Nathaniel Bowditch Park project represents a success story in which city officials work with both residents and business people, to balance individual interests and needs in order to make better use of a neglected waterfront area. The initial design is evolving rapidly, incorporating new, second-generation ideas that would not have surfaced without the planning process. Salem realized that its past traditions and architecture can lead the way toward a successful future.

BEVERLY: New Life for the Harborfront

Constant change. These two words describe life and industry along the Massachusetts coast. The North Shore community of Beverly was once an active commercial port. It is the birth place of the American Navy; George Washington, Commander of the Colonial forces, once sailed from its harbor on the Danvers River. During the industrial revolution, waterfront usage shifted to oil and coal storage. Today, private marinas fill the harbor. A small public beach is located at one corner of the harbor front. Access to the sole public landing is through a restaurant parking lot off the city's main street. Only a handful of fishermen and boaters presently use this limited facility. Public access to the waterfront is almost non-existent

The city wanted to develop a plan for improving public access, boating, swimming and recreational opportunities, along the harbor. Community leaders believed these improvements would act as a catalyst for further public and private improvements. Using a CZM grant, Beverly hired a consultant to help develop a people-oriented plan for the waterfront. The plan recommended building a large public dock, landscaping the area, improving parking areas and boat ramps, and developing a pedestrian walkway along Water Street to connect the public landing and the beach.

This plan resulted in an urban waterfront concept that has spurred further waterfront interests in Beverly. A private developer has proposed building a condominium complex, including a marina, on a coastal site occupied until recently by a chemical tank farm. The city, with a second CZM grant, is studying potential market demand for restaurants, housing, and retail shops in the harbor area. Based on recommendations contained in the first study, CZM is helping the city secure funds to reconstruct its historic town landing, and city government is working to improve the adjacent Beverly-Salem bridge and revitalize a nearby historic district. Constant change continues. Beverly is thoughtfully and carefully laying the foundation for a revitalized, accessible, people-oriented waterfront.



DANVERS: Innovative Recreation Planning

Danvers Harbor, at the confluence of the Danvers, Waters, Crane, and Porter Rivers, was once an active commercial trading center. Today, the harbor area is predominately residential. A popular recreational boating center, the area contains a yacht club, marinas, boatyards, town slips, a landing ramp, a public beach, and parking facilities. The remaining undeveloped land is primarily wetlands and floodplain.

The town received a grant from CZM to prepare a recreation master plan. The town sought ways to expand recreational opportunities while protecting its natural resources. Citizen involvement played a major role in the project.

A citizen Harbor Task Force, with representatives of a broad mix of harbor interests, was formed at the beginning of the project. The committee included business representatives, town officials, harbor area residents, and environmental interests. The Task Force worked closely with a landscape architectural firm, and guided development of the master plan. They provided information and ideas to their consultants, and evaluated the work of the planning firm.

In the study, community recreational needs and desires were identified through telephone surveys and public meetings. The consultant assessed the harbor's capabilities and made recommendations for future development options. As a result of its collaboration with the planning firm, the Task Force established priorities for harbor development which addressed town recreational needs, the problems of building on unique and fragile lands, and the feasibility of implementing the plan.

The group recommended improving recreational opportunities, boating and swimming facilities, and water quality. It proposed preserving remaining open space land for conservation, recreation, and scenic purposes. It encouraged establishing a harbor district, and increasing public access points.

The estimated capital cost for development of recreation facilities as proposed in the master plan is $4 million. Half of the cost would be financed through increased fees and taxes generated as a result of new development.

The Harbor Task Force now has prime responsibility for implementing the master plan. Town officials requested changes in some recommendations, and the task force responded by forming three subcommittees to study land use and zoning, open space, and transportation aspects of the plan separately.

The highest priority for the town is harbor dredging. Danvers received another CZM grant to perform a preliminary engineering assessment of the area. As a result of the study, funds for dredging the Porter and Crane Rivers have been appropriated.

Other aspects of the master plan, such as zoning changes and developing new parks, are also underway. The town has implemented new waterfront zoning.

According to Danvers project coordinator Dale Levine, town officials happily "take a back seat to this highly active and involved group who put in time and effort to see things through. They're a super group, and it really works."

NEWBURY: Better Management of Plum Island

Barrier beaches play a unique role in coastal protection. They are geologically active and protect the mainland from the full force of ocean storms by absorbing the constant battering of winds, waves, and currents. Their form or profile is constantly changing. Undeveloped barrier beaches cause little harm to people. Developed barrier beaches however, place homes, property, and sometimes lives in jeopardy.

Plum Island, an 8-mile-long barrier beach situated in the northeastern Massachusetts towns of Newbury and Newburyport, faces many such problems. The northern third of the island is densely populated. A state park is located at the southern tip of the island, while the remainder of the land is a federally-owned wildlife refuge.

About a thousand people live in the populated area of Plum Island, on about 400 acres of land. The real estate value of the homes is $40 million, and is increasing annually as summer homes are converted for year round use.

Plum Island residents have many serious problems. Some water supplies are polluted. Waste disposal facilities are inadequate. Residents live with the constant threat of flooding and beach and dune erosion. Their neighborhood contains unsafe, abandoned houses and sheds. Finally, the area is troubled by excessive automobile traffic in summer and limited parking facilities. Residents and local government officials needed substantive planning information to solve problems and control growth.

CZM provided a grant to the town of Newbury to develop a management plan for Plum Island. The Plum Island Taxpayers Association, a local citizen group, were strong advocates of the study.

A seven-member Plum Island Study Committee was formed to work with a planning specialist hired to develop an 18-month action plan. Together they analyzed the issues facing Plum Island, and produced a report recommending corrective measures for the Island's problems.

Many project recommendations are being implemented. Some unsafe abandoned shacks and sheds have been demolished.

The town of Newbury has developed and funded a program to improve trash pick-up and traffic control. Both Newbury and Newburyport are now working together to solve other traffic related problems. A proposal to begin a shuttle bus service from downtown Newburyport to the state park is being evaluated. Additional parking facilites to accommodate 300 more cars is being reviewed by federal refuge officials. In the spirit of cooperation and problem solving engendered by the town study, residents of the normally isolationist Plum Island community now serve on the Newbury Planning Board and Board of Selectmen.

Living on a barrier beach is never easy or safe. The values and needs of residents sometimes conflicts with those of nature. However, for the thousand people living on Plum Island, this CZM-funded project helped solve some problems while increasing their understanding of the coastal environment.

NAHANT: A New Park by the Sea

To the town of Nahant, 29 acres of open space abutting the ocean seemed a prize public resource awaiting development. The land, known as the Spring Road area, was the site of the former town dump closed in 1963. Many factors inhibited development, however, and the town requested CZM funding assistance to conduct a feasibiity study of development options.

The town hoped to use the land for active and passive recreation. It wanted to construct baseball fields and picnic areas along the ocean, with some land set aside for conservation. The Spring Road area, however, is subject to storm flooding from both the ocean and overflowing storm drains. To address this problem, one town proposal called for developing a retention basin at the site to control flooding and private run-off protection for the area.

A planning and engineering firm was hired to analyze the area and make use recommendations to the town. The town has implemented many of the consultant's recommendations. It has made improvements to the area's drainage system, including the installation of wider drain pipes and the construction of new culverts. Most important, the town installed a new baseball field and play ground, meeting important recreation needs.

The engineers found that developing a retention basin would cost over $400,000, and the town decidcd not to implement this option.

All totaled, the town of Nahant invested over $100,000 to improve the area. For its investment, Nahant has transformed an under-utilized parcel of land into an enjoyable new park by the sea.

REVERE: Growth Management Planning

The Massachusetts city of Revere means many things to different people — the site of a widely used MDC public beach, the former home of a major waterfront amusement park, and the current site of many fine restaurants and a successful race track. For the most important group however, it is home.

Revere is an older residential city with a limited tax base. The shoreline and Saugus marsh wetland system comprise over half of the city. Many houses and apartments lie in the coastal floodplain. Repeated flooding and storm damage affect the city's coastal homes and businesses. During the Blizzard of 1978, disaster hit the city, leaving thousands of people stranded in their homes or protected in public shelters on higher ground. Numerous homes and businesses were destroyed.

Many conflicts surround the salt marshes. From a scientific perspective, the salt marshes provide an important habitat for wildlife and a natural storage area for stormwater runoff. To many businessmen the wetlands represent an underutilized resource, an area to be filled for new development that will improve the city's tax base.

Many current debates surround the use and abuse of the salt marshes. Some local and regional projects threaten the flood control ability of the marshes. The proposed extension of the MBTA Blue Line from Revere to Lynn would cut across the Saugus Marsh, for example. While in violation of state law, some marsh areas are currently zoned for industrial use. Illegal dumping has occured in the wetland area for years, often because legal dump sites are inadequate or nonexistent.

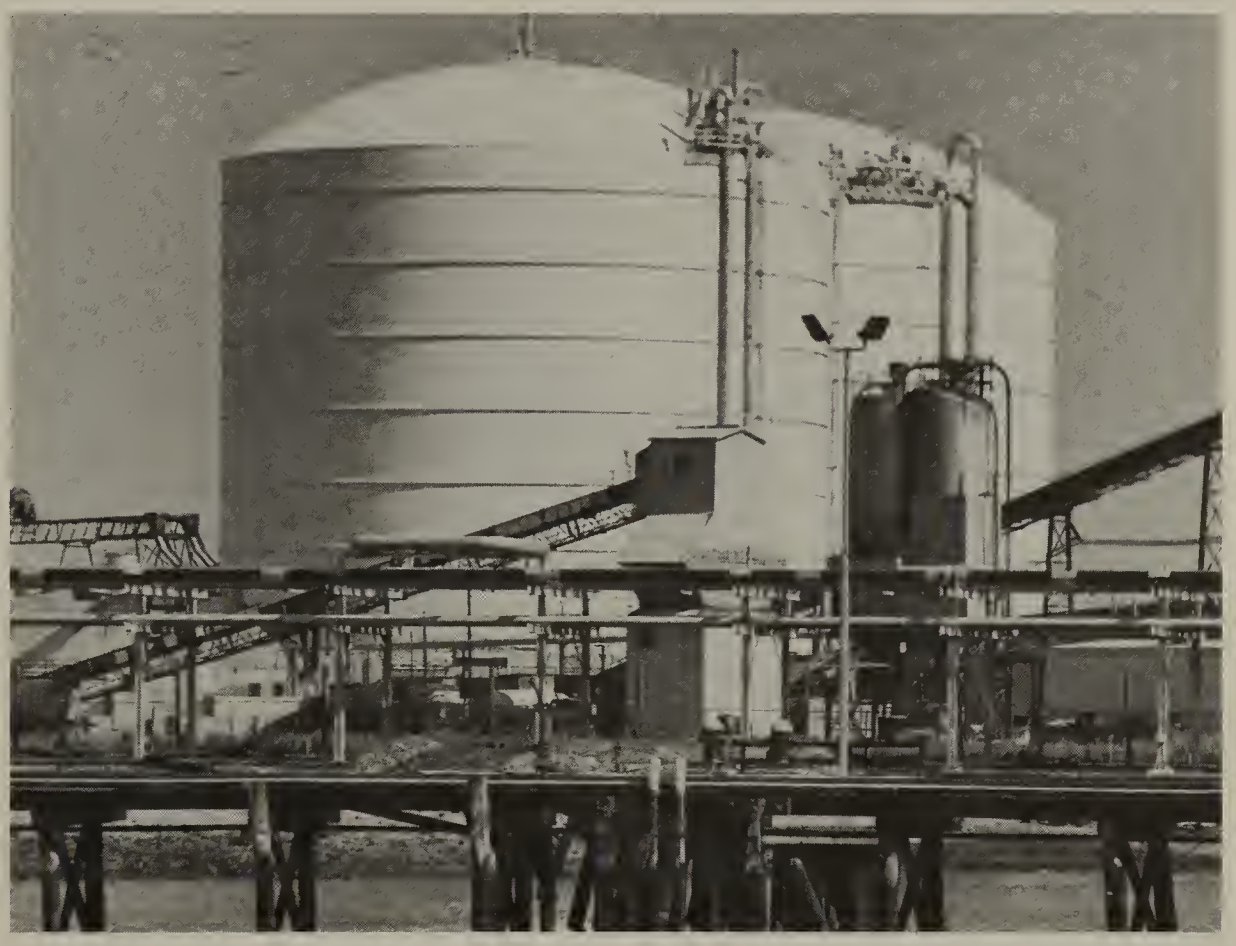
Attempts to halt the dumping have proved unsuccessful. Revere had no overall plan for growth, and no clear understanding of how the wetlands protect private property. With major highway construction imminent, and the prospect that it would draw new commercial development, Revere decided that a growth management plan was necessary.

The city of Revere received a CZM grant to develop an information base on the role of wetlands in land use protection. A working map and land management plan were developed. The study yielded recommendations for restricting development in areas prone to flooding, and for improving coordination of private and public projects in order to protect wetland resources.

Implementation of some recommendations has begun. A park and recreation buffer is being built in an area formerly used for illegal dumping. The city is revising its floodplain zoning regulations. The Conservation Commission has hired a full time staff person to handle wetlands issue and enforcement. And the city, to better protect its wetlands, is lobbying to get the highway connector elevated on piles.

A strong spirit dominates local decision making in Revere. This project generated much debate. The rapid implementation of some recommendations is testimony to the hard work of many Revere citizens and officials. The work was worth it, and future directions are set.

EVERETT: Energy Planning for the Future



To many, Everett is the energy center of the Commonwealth. The Everett waterfront along the Mystic and Malden Rivers accommodates large tankers from throughout the world. They carry petroleum products such as home heating oil, gasoline, liquified natural gas (LNG), and liquid propane — the energy resources that fuel the Massachusetts economy. Directly behind the piers and wharves are major industrial plants where the unloaded products are stored, used, or distributed. How to accommodate industrial expansion and set priorities among competing industries and uses was the major coastal management question facing Everett.

With CZM funding, the city prepared a waterfront management plan which contained recommendations for accommodating industrial and recreational interests.

The planners addressed many issues. Many businesses wanted to expand, yet little vacant land remained for development. In addition, the town lacked planning tools such as a complete set of property maps, and knowledge of the capacity of docking and unloading facilities to handle increased industrial activity. Some local residents wanted to see expanded recreational boating facilities as well, creating a conflict in use in a heavy industrial area.

The Everett Waterfront Management Study resulted in a number of recommendations. Because of the value of the industries — the value of the 10 largest firms is almost $89 million — and the contribution the energy operations make to Everett's tax base and employment opportunities, the plan recommended that vacant parcels be developed for industrial use. Because streets along the the waterfront are in poor condition, the report recommended improving both public and private roads. Further, recreational opportunities could be created by constructing a public ramp for small boats on MDC land and developing a marina farther along the river. Wetlands should be restricted for conservation, and companies encouraged to maintain existing open space along the waterfront. In general, water-dependent operations should have high priority for waterfront expansion. All development except for industrial and recreational uses should be discouraged, the report stated.

In part, as a result of the study, the town has obtained federal funds for improving the public roads which are badly pot holed and particularly dangerous for trucks carrying LNG. Property maps have been published, and are proving useful to planners, industries, and local assessors.

With planning efforts like this, the leaders of Everett are ensuring the continuence of energy storage and transfer facilities for Massachusetts' future. In addition, local job opportunities and industrial development will expand.

WINTHROP: Studying Yirrell Beach, and Winthrop Embayment

Like many coastal communities, the town of Winthrop incurred serious damage during the Blizzard of 1978. Coastal waters overtopped seawalls and damaged homes, leaving behind much sand and debris. While the blizzard represented an extreme case, coastal storm related problems have occurred in Winthrop for decades, if not centuries.

Yirrell Beach in Winthrop, located between Winthrop Harbor and Deer Island (just north of Boston Harbor), has been severely impacted over the years.

The town of Winthrop received a CZM grant to study coastal processes along Yirrell Beach. The study included a historical shoreline change analysis dating back to 1620 which described continual changes to the coast from natural causes and man-made structures.

The study also concentrated on two specific problems: (1) how to protect the homes located along Yirrell Beach, and (2) how to protect the town standpipe located on an eroding hill at the northern end of Yirrell Beach.

The study recommended construction of artificial sand dunes or ridges in front of the existing seawalls. This step, the consultant believed, would help to protect both the homes and the beach from coastal flooding and erosion.

Sand has been placed on the beach, but not without conflict. Some homeowners feel that the mounds of sand are an eyesore, and would like them removed.

On the matter of the town standpipe, the study found that storms and foot traffic have eroded the front of the hill which supports the water tower. In fact, the study found that the Winthrop scarp is retreating at a rate of 5-8 inches a year. A scarp is the geologic term used to describe the low steep slope along a beach caused by wave erosion.

The geologist recommended fencing and planting the area to impede erosion. If no action is taken, the water tower will eventually fall into the sea. The town is attempting to secure the funding necessary to install the fence and plants that will protect the standpipe and water supply.

Beyond specific insights and recommendations, the most lasting value of the Yirrell Beach Study may be educational. Town residents have a better understanding of their environment and the natural forces affecting it. This knowledge will lead to better management in the future.

A second grant for Winthrop concerned shoaling in a fishing and recreational boat dock area of Winthrop Harbor, known as the Winthrop Embayment. The embayment is located in the northeast section of Boston Harbor, and is protected from the full force of ocean storms and currents by Yirrell Beach and several islands. Because of its southwesterly orientation, sediment flows into the harbor, but does not leave it.

The channel was last dredged in 1969. While some sediment was removed from the harbor, most of it came right back in. Shoaling has increased dramatically in the last ten years, making navigation impossible at low tide.

The town sought CZM funding to study the sources of shoaling, filling, and sedimentation problems.

The Winthrop embayment study determined the causes of siltation and recommended sites for placement of dredged materials. The study proposed dredging the harbor to deepen the channel and increase the tidal flow. The study also proposed developing an area in the harbor for recreational boating.

The town has filed legislation with the Massachusetts legislature seeking funding for dredging, and the legislature is considering the request.

BOSTON: New Uses for the Troy Landfill

To the residents of Dorchester and environs, the concept of twelve acres of open space available for recreation or other development seemed almost inconceivable. For such a large parcel of undeveloped land to be located along the waterfront is even more unusual. Such a site does exist, and is known to residents of Boston as the Troy Landfill. It lies just south of the Sister Corita gas tank on Dorchester Bay.

In 1969, a developer received state permission to develop a small peninsula of land in Dorchester Bay into a marina and motel complex. Twelve acres of tideland were filled. However, because of the content and placement of the fill, the license to fill was revoked by the state. The development never occurred. Today, overgrown shrubs, trees, and granite slabs dominate this open landfill area.

The site has great scenic and recreational potential. But, many questions needed to be answered before a plan for its use could be developed. Water quality near Tenean Beach in Dorchester had detoriated over the years. Silting had reduced the use of the lower Neponset River by the Old Colony and Port Norfolk Yacht Clubs. Some people wondered whether the landfill caused these problems. Thorny legal questions concerning ownership of the landfill, payment of back taxes, and the legitimacy of the existence of the landfill persisted.

Because resolution of the long standing problem hinged in part on the financial feasibility and environmental rationale for removing the illegal fill, the Boston Conservation Commission obtained funds from CZM to undertake an engineering study to determine if the landfill had indeed caused contamination and silting, and whether the site could be used for recreation. The study also evaluated the cost and impact of removing part or all of the fill.

The study concluded that the landfill was not adversely impacting the surrounding area, and therefore removal of the fill was not required. In fact, the engineers found that the fill had stabilized the area, and that its removal at this point would cause more harm than good. The study recommended leaving the fill and outlined options for improving the site.

Due to cooperative efforts by the city and the state, the Metropolitan District Commission (MDC) has received title to the Troy landfill site. With the aid of CZM-administered Coastal Energy Impact Program (CEIP) funds, the Executives Office of Environmental Affairs has assisted the MDC in preparing preliminary plans to use the landfill site as a passive recreation area linked to nearby Tenean Beach and the Neponset River shoreline to the south.

While problems with the landfill have persisted for many years, strong leadership and determination on the part of the Boston Conservation Commission, the Executive Office of Environmental Affairs, and the local state representative promise to put an underutilized urban resource to good use for the residents of Dorchester and the greater metropolitan area.

14 *Boston Harbor Region*

BOSTON: The Potential for Ship Repair at Boston Marine Industrial Park

The 1973 closing of the Boston Naval Shipyard, a ship repair facility in the Port of Boston, resulted in the loss of 6,000 jobs. Boston's Economic Development and Industrial Commission (EDIC) is responsible for redeveloping the shipyard into the Boston Marine Industrial Park. Since 1975, $15 million has been invested by the City of Boston, the federal Economic Development Administration, and private companies, to transform this once deteriorating facility into a vibrant industrial center. Over 1000 new jobs have already been created at the marine industrial park, with a goal of 3,500 jobs created by 1983.

One part of the industrial park plans called for the possible development of ship repair facilities to compete successfully for worldwide ship repair business.

The EDIC received a CZM grant to perform a market survey and analysis of ship repair facilities and to assess future needs. The study focused on Drydock #3, the yard's largest facility. This drydock has size (it is over 1200 feet long) and other characteristics needed by modern Navy and merchant marine vessels. This drydock is currently being leased by a private ship repair firm on a demand basis, and is underutilized.

The study concluded that the ship repair industry in Boston Harbor was declining because of high repair costs, inferior job skills, and inadequate facilities. To address the identified need for skilled labor, the marine industrial park initiated a training and apprentice program.

The report identified the U.S. Navy as the facility's best potential customer. The Navy's new, larger and more sophisticated class of ships requires a large facility like Drydock #3. Feeling that the Navy's needs will increase in the future, the EDIC is currently advertising nationwide for a private ship repair tenant to manage this large drydock facility.

QUINCY: Black Creek Marsh Estuary

Black Creek is a salt marsh system on Quincy Bay in Boston Harbor. It encompasses a 100-acre recreation and conservation area, adjacent to Merrymount Park in the center of the city and is highly valued by Quincy citizens for its beautiful marshes, nature trails, bicycle and jogging paths, bird watching and sail boating opportunities.

The replacement of an earthen dam at the mouth of the embayment increased the tidal exchange in the basin; during the same period in the mid-1970's, a two year dredging project caused the redistribution of sediment into the creek and onto the marsh. In addition, the area surrounding Black Creek has been subject to many pressures, and the conservation commission wanted to obtain factual information about the marsh system in order to evaluate the estuary's condition and to determine ways to protect and manage it. With support from the park and recreation board, the school administration, and citizen associations, the conservation commission requested a study of Black Creek to identify its vegetative composition, animal populations and marsh productivity.

The biological study revealed that the Black Creek salt marsh was healthy and productive. The sailing program and other recreation activities were found to have few adverse effects on the ecosystem. To encourage continued use of the area, the report recommended marking

nature trails, extending bicycle trails, and establishing nature programs for school and other groups. To ensure continued productivity of the estuary, however, the report urged that all future dredging be prohibited.

This study will be useful to the Quincy Conservation Commission as a management tool, and will bc an cducational resource for area students learning about salt marsh ecology.

HULL/COHASSET: Improvements at Straits Pond

For years, the people who live around Straits Pond in Hull and Cohasset have experienced foul odors and other inconveniences. Originally a tidal marsh, this 92-acre pond was dammed in the 1800's for use by a mill. As early as 1900, complaints were made about heavy weed growth and foul odors from the pond. Sewage and wastes were being discharged into the pond at the turn of the century; they still are. Septic system overflows discharge into the pond, as do storm drain overflows. The problems compound one another. Midges, small two-wing flies, now breed in large numbers in the pond.

Despite these drawbacks, residents of both communities use the pond for sailing, sculling, and skating.

The Hull Board of Health proposed the establishment of a reclamation program for the pond. Together, Hull and Cohasset sponsored a CZM-funded study to analyze the pond's physical, chemical, biological and ecological characteristics. The town hoped to develop procedures to restore the pond and increase its recreational use, and to improve the local environment for the homeowners surrounding the pond. A consultant was hired to analyze the problems and propose solutions.

The Straits Pond study recommended that Hull and Cohasset change zoning and health regulations to reduce the level of pollutants entering the pond. The consultants concluded that regular flushing would increase water circulation and thus reduce the odor problem. In addition, they recommended draining the pond from October to March to expose and dry out the bottom sediments as a means of controlling weeds and flies. Some bottom sediments could be removed at the same time. The proposed program involved low-cost management techniques rather than expensive chemical treatment or weed harvesting.

And the results? Hull has already begun implementing the recommendations. Storm drains have been cleaned up. Abutters have been advised not to throw yard trimmings into the pond. In preparation for drawing down the water over the winter, Hull has already replaced a broken tidegate and repaired a leaking retaining wall. In time, sewer lines presently being installed in other parts of Hull may be extended to Straits Pond. After almost a century of neglect, the restoration of Straits Pond is now underway.

COHASSET: Developing a Harbor Master Plan

From a landlubber's perspective, the south shore community of Cohasset has a lovely and picturesque harbor well integrated with its surroundings. From a seaman's point of view, the harbor is busy and overcrowded. Over 1000 sailboats, motorboats, dinghies, and fishing boats use every available public and private mooring, dock, and float in the harbor. Bustling boating and fishing activities continue throughout the evening, when the harbor is lighted and patrolled.

Problems at Cohasset harbor abound. Physical access to the harbor is limited. The town has inadequate parking facilities. Historic narrow roads feed into the harbor area. Recreational boaters need more fueling services, day-sailing facilities, and mooring spaces. The town waiting list for mooring spaces contains 150 names; the town only has 450 moorings.

Commercial fishing operations are equally confined. The local fleet of 40 lobster boats does a $1 million-a-year business, yet lacks moorings for larger boats, off-loading facilities, cold storage facilities, and an all-tide, all-season dock for the year round business activities.

To address these problems, the town sought CZM funding assistance to develop a harbor master plan. The Cohasset Harbor Committee, a long standing seven-member group with authority to manage the harbor, initiated the study.

The consultants hired to conduct the harbor study concluded that because of the harbor's limited size (34 acres at low tide) and existing land use, no major harbor expansion opportunities existed. Any elements of a master plan would have to address more efficient use of existing space and facilities.

Specific recommendations call for expanding the existing parking lot, constructing a floating pier, and building new fuel service facilities. Other suggestions call for developing a well-marked historic walk along the harbor, and constructing a new access road to the waterfront, a new boat ramp, and new ship stores and dry storage facilities. Finally, the consultant recommended increasing mooring surveillance.

The Cohasset Harbor Committe has responsibility for implementing specific elements of the master plan. The first step toward expanding the town wharf, selection of the consultant to design the wharf, is completed. Construction of the salt house pier has also been accomplished. A local businessman has installed a marine fuel pump. The harbor master will improve evening patrols and lighting in an attempt to improve traffic circulation in the harbor. The harbor mooring system has been reorganized to allow for more efficient use of limited mooring space. The town has also implemented many small projects to beautify the harbor.

Cohasset received a second CZM grant to perform preliminary engineering and design work to expand its commercial fish pier. This work, resulting from the first study, is scheduled to begin in the latter half of 1982.

While small in size, Cohasset Harbor still has options. This master plan provides the foundation for improved facilities within limited space, proving once more that small can be beautiful.

SCITUATE: Improving the Harbor

Maintaining and improving a harbor is often a high priority for coastal communities. A town's harbor is often the center of the community's business, historic, and recreational life. But solving current problems and planning for the future takes resources beyond the means of most towns.

The harbor in the south shore community of Scituate is a case in point. While large at 250 acres, Scituate harbor accommodates almost a thousand recreational boats and more than two dozen commercial fishing and party boats. As the number of boats increases, conflicts between commercial and recreational boaters over use of limited space grow.

Scituate has paid close attention to its harbor over the years. The town has funded various harbor management studies over the past 20 years which focused on ways to improve existing facilities. Harbor crowding, traffic congestion, and lack of adequate facilities continued, however, and the town asked CZM to fund a harbor master plan to provide a comprehensive and long-term perspective on ways to improve harbor use and management.

Public participation has high priority in Scituate, and the combined energies of many town boards and committees — the Board of Selectmen, Planning Board, Scituate Coastal Zone Management committee, and Scituate Harbor Revitalization Committee — were channeled into the harbor master plan. Opinions differed on the extent of

harbor development necessary, as well as on environmental impacts resulting from various options. Local economics also played a role in town decision-making; recreational boating in the harbor represents a $21 million business annually.

The harbor master plan developed by the town and consultants contained a five-year implementation program. Recommendations called for reconstruction of the town pier, expansion of the public marina, and development of a connecting walkway. Dredging was proposed to improve commercial boat traffic and improvements were suggested for the Harbor breakwaters. Future development scenarios were also prepared as a part of the master plan.

Implementation has already begun. The town received a CZM Coastal Energy Impact Program (CEIP) loan to expand and upgrade the town marina, including slips for 100 additional boats, a harbormaster's building, and boat repair and emergency storage facilities. The town has also received a state energy agency grant to study the use of solar energy for the harbormaster's building. Reconstruction of the town pier and construction of the walkway, are next on the town's agenda.

Through years of work and dedication on the part of many citizens and officials, the town of Scituate has a harbor master plan for the near and distant future. One of the town's most vital resources, its harbor, will continue to serve the town well for many decades to come.

MARSHFIELD: Planning for Green Harbor

Harbor management and master plan studies predominated the early rounds of CZM Community Assistance Program grants. This may reflect the high priority on sound planning established by the CZM office, and the need for new and flexible planning resources by cities and town.

The south shore community of Marshfield faced a particular set of problems in its main harbor, Green Harbor. Abutting the open ocean and wetlands, Green Harbor has experienced serious shoaling in the harbor inlet, making boat transit through the channel difficult except during high tide. Inlet shoaling has been exacerbated by the restriction of water in-flow caused by a dike and a tidal gate. The result has been an accumulation of sand in the harbor. The Army Corps of Engineers must dredge the channel every three years (at a cost of $150,000/dredging) to keep the channel open.

In addition, harbor users face serious land access problems to the town pier. The only existing road from downtown to the town pier is narrow and heavily congested during the boating season. Between 200 and 300 boats are launched from the town pier landing ramp on summer weekends.

The town pier also services the needs of a 78-vessel local commercial fishing fleet. Commercial fishing is a $1 million business annually in Marshfield. Facilities for commercial fishermen, however, are inadequate, and commercial fishermen often find themselves competing with recreational boaters for space.

With CZM financial assistance, Marshfield engaged an engineering consulting firm to study these problems and recommended solutions.

The consultant proposed dredging the harbor and reorienting the jetties at the harbor inlet, extending a roadway to the harbor via a wetland area, and developed plans for new commercial fishing facilities at Town Pier.

The Army Corps of Engineers has dredged the inlet according to the modifications proposed in the study, and has agreed to build a new jetty to better control sedimentation.

Because alterations of wetlands are involved in proposals to expand the roadway and harbor certain recommendations have not been implemented. State laws (the Wetlands Restriction Act and Wetlands Protection Act) restrict certain uses and activities in coastal wetlands. The wetlands surrounding the harbor are restricted, and thus protected, under the Massachusetts Coastal Wetlands Restriction Program.

Solving Marshfield's problems won't be easy. This study highlighted many of the factors influencing town options. The importance of coastal wetlands to all of Massachusetts has overriding importance. This study sheds more light on Marshfield's problems and will make for better decision-making in the long run.

PLYMOUTH: Improving the Waterfront

Since construction of the Pilgrim I Nuclear Power Plant, the community of Plymouth has been something of a boom town. Low property taxes encouraged extensive housing development, and the population has increased 82% in the past ten years. Plymouth's commercial fishing fleet has increased from less than a dozen to 58 vessels. The number of draggers and gill netters has more than doubled in the past five years alone. Local fishermen do not have enough space at the town wharf now, yet further fishing expansion is anticipated. The number of tourists seeking recreation, entertainment, and restaurants has also increased dramatically. The downtown waterfront is a bustling, if overcrowded place.

Plymouth town government, responding to these pressures, obtained a CZM grant to study the entire downtown coastline. The town hired a planning firm to identify land use and facility needs, and to make recommendations to solve problems and meet future growth needs. A Waterfront Steering Committee of local businesspeople and townspeople was formed to serve as study liaison. The planning process helped to coalesce the local fishermen who organized for the first time to make sure their needs were represented. Public hearings and meetings were well attended at all stages of planning.

The final waterfront plan proposed changes in the town which would enhance fishing and tourism while maintaining the essential fabric of the town. One recommendation called for concentrating new public and private development on the Town Wharf and along Water Street, and providing growth opportunities for new speciality retail stores and a resort hotel. The plan called for a new and improved commercial fishing pier, with unloading and processing facilities. Other recommendations include improved recreational boating ramp and marina facilities, improved traffic circulation through shuttle bus services, and construction of both a pedestrian pathway and expanded parking facilities. Aside from these specific recommendations, the project generated widespread interest in the waterfront, and improved communication among various community interests.

The plan is ambitious, and will serve as a long-term guide to town development. Some projects are already underway. A privately operated shuttle bus has begun operation. Plans were recently approved for construction of 20-30,000 square feet of retail space on Water Street. And in the spirit of accommodating growth, the town approved plans for development of a private marina-restaurant-retail shop complex two miles away from the downtown area. With a subsequent CZM Community Assistance Grant, the town is busy preparing designs for public improvements as well as a "developer's kit" with which to attract new investment to Town Wharf.

PLYMOUTH: Developing A Pedestrian Walkway

Site of Plymouth Rock and symbol of American history, Plymouth once served as a major port for trade, fishing and ship-fitting. The town was hurt economically 20 years ago when a significant local industry, the world's largest manufacturer of rope, moved away. Today, tourism and recreation play major roles in Plymouth's waterfront activities. Three quarters of a million tourists annually spend $5 million for pleasure boating, sport fishing, swimming, historic site-seeing, and ocean viewing.

Plymouth has long been aware of the need to develop marine, history, and tourism-related land activities to take better advantage of its waterfront and expand downtown businesses. As a first step in this development, the town saw a need to provide a pedestrian walk to link these two areas. The town used a CZM urban waterfront grant to develop a walkway plan. A non-profit businessmen's association, working closely with the planning department, provided both money and advice in developing the plan. A consultant was hired to develop a blueprint which included specifications for a brick paved walkway, benches, trees, rerouting vehicular traffic, and installing underground utilities.

Money to develop this project will come from private efforts. "Implementing the plan will take time, but it will provide a guide for businessmen," according to the town planning director Ray Frieden. High development costs and difficulty putting the utilities underground are the reasons for delay. Once the plans are implemented, however, Plymouth will have improved links between the waterfront and downtown businesses and, like many revitalized Massachusetts cities and towns, will look forward to the 80's with great expectations.

SWANSEA: Cole River Shell Fishing and Ocean Grove Beach Improvements

The town of Swansea is located on Mt. Hope Bay in the south-eastern corner of Massachusetts. Mt. Hope Bay marks the border between Massachusetts and Rhode Island.

The rivers in Mt. Hope Bay are bounded by salt marsh, and once served as an active commercial fishery. Today, the Coles River in Swansea is the only river which remains unpolluted and open for shellfishing. However, the community does not have facilities for commercial fishing. The 40 commercial shellfishermen who work the Coles River lack river access and pier space. The town landing is for recreational boaters only. The fishermen currently tie up their skiffs wherever they can along the banks of the Coles River, and often on private property. Because of the lack of dock space and facilities, they are forced to park along narrow and crowded roads.

With part of a CZM grant, the town hired an engineering consultant to identify suitable areas for developing a shellfish pier and a small scale facility for fish handling and boat storage.

The consultant identified seven potential sites along the river. However, problems existed with each of them. The sites were either zoned residential, needed filling or dredging, or would have frozen over during the winter. Landowners along the river, and recreational boaters, were opposed to developing any of the sites. In addition, the consultant concluded that any site would require a substantial financial investment, one more obstacle to development. With strong feelings raised among all of the parties, the town has not yet taken any action to implement the consultant's recommendations.

With the same grant, the town took a preliminary look at a second and totally separate issue. The town used CZM funds to review erosion problems at Ocean Grove beach, the area's largest public swimming area, and a barrier beach. With the exception of the public section, the beach was bulkheaded after the 1938 hurricane. The entire area suffers from severe erosion. The study identified ways to better maintain the beach and lessen the impacts of erosion.

A new chapter is unfolding in the effort to better utilize and manage Ocean Grove beach. For several years, the town, together with an active neighborhood revitalization group called *Friends of the Bluff*, had planned a major upgrading of the beach and the area by the Bluffs Community Center. To accomplish this, Swansea received a CZM-administered Coastal Energy Impact Program grant to develop a master plan for the area.

Because CZM was concerned that the area is a hazard-prone barrier beach, this study specifically addressed the desirability of major public reinvestment in areas such as the bluffs. During the first phase of the project, Swansea evaluated the history of the area and developed design guidelines consistent with Governor King's Barrier Beach Executive Order. During the project's second phase, Swansea prepared improvement plans for those parts of the beach not threatened by coastal hazards. With the succesful completion of the Ocean Grove Beach Study, the town of Swansea is now seeking funds to begin construction of long-awaited improvements at their beach. After years of concern, Swansea is working toward solutions and a better understanding of their problems.

MARION: Improvements to Sippican Harbor

Sippican Harbor in the town of Marion is typical of the beautiful and protected harbors of Buzzards Bay. Unlike its busier neighbors to the north and across the Bay on Cape Cod, Sippican Harbor offers a more remote boating experience.

Even in this quiet setting, demand for more moorings, ramps, docks, and landing space is increasing. The town docks are inaccessible at low tide, and shoaling in the channel makes navigation difficult. The Massachusetts Division of

Waterways had plans to dredge the harbor, and the legislature had appropriated the necessary funds. Before dredging could commence, however, more dredging and disposal site information was needed. CZM provided the funds to collect the necessary pre-engineering information, provided that innovative disposal solutions would be investigated.

With these harbor management and dredging problems in mind, the town engaged an engineering consultant to develop a harbor improvement plan. The chemical composition of the material to be dredged was identified, along with a good location for its disposal, away from shellfish beds and in an area which would not restrict boating activities. Measures for better management of the already limited space in the harbor were recommended, such as a better layout of moorings to increase spaces, construction of floating docks, and relocation of the channel to decrease dredging needs.

The plan did serve successfully as the basis of information needed for harbor dredging and disposal. With the cooperation of both citizen and state officials, the plan is being carried out. The town obtained permission to use the proposed disposal site, and at a recent town meeting the citizens voted to proceed with dredging. The Division of Waterways dredged the harbor in the spring of 1982.

In addition, the town would now like to develop mooring plans in greater detail, and develop better harbor regulations before relocating moorings.

NEW BEDFORD: Toward a Revitalized Harbor

Even before the days of Herman Melville, New Bedford meant fresh fish. The sound of hammer against nails as fish are boxed for the American market, the pulsating roar of diesel engines moving boats in and out of port, and the ubiquitious bevy of gulls mixed with the strong voices of New Bedford fishermen, begin to paint a picture of this important commercial fishery center.

As in any commercial venture, change and modernization are important elements of expansion and growth. For New Bedford, this means expanded port facilities and harbor dredging to meet the needs of increased fishing under the 200 mile law and the needs of larger and more efficient new boats.

The city planning department has worked hard to create historic districts and to revitalize the port. They asked CZM for assistance in funding the completion of a bathymetric study of the harbor bottom. The study measured bottom contours in the harbor as a preparatory step to dredging, and determined the total cubic volume of material to be dredged.

Dredging may still be some years off. Historically an important industrial center, New Bedford harbor and the Acushnet River feeding it have some of the highest levels of PCB's in the country. Finding a safe way to dredge the harbor and dispose of the contaminated dredge material will require careful planning, new studies, and much hard work. The port of New Bedford has met many challenges in more than 300 years of commercial operations. It will surely overcome this obstacle as it prepares for an expanded fishery in the 1980's and 1990's.

WESTPORT: Understanding Erosion at Horseneck Beach and Shoaling at Westport Harbor

The Buzzard's Bay community of Westport remains a lovely, rural, quiet southeastern Massachusetts town. Its traditions live on. Many people know Westport as the home of Horseneck Beach, a large state park reputed to have the best surfing in the Commonwealth. Westport Harbor is an important docking area for 25 fishing vessels and numerous recreational boats. The town had two distinct problems relating to these areas which it wanted to address: erosion damage at Horseneck and East Horseneck Beaches, and shoaling at the entrance to Westport Harbor. CZM provided the funds for studying these problems.

East Horseneck Beach is seriously eroding; all of Horseneck Beach is prone to damage during storms. The study identifies the sources of these problems.

Historically, the primary source of sand to the beach has been Goosebury Neck, a sandy neck lying between the two beaches. A causeway leading to the neck, originally constructed shortly after the turn of the century and added to during World War II, had been blamed for starving East Horseneck Beach of sand. The consultants discovered, however, that rather than increasing erosion, the causeway construction had cut the erosion rate in half.

The consultant's report recommended that natural processes be allowed to continue without human intervention. One conclusion reached by Steve Bliven, former town conservation officer, is that "It's a dynamic area, and can not be controlled."

The report also recommended building an artificial cobble dune to protect the trailers that border the beach. As a long term solution to the problem of the vulnerable trailers, the town is proposing removing them to safer areas during the storm-prone winter months.

Another area investigated in the study was the shoaling of the Westport River Inlet leading into the harbor. The current channel runs across the shoals and repeated dredging efforts have not worked to keep the channel deep. Larger boats must wait for high tide to enter the harbor, or use another, deeper channel which requires traveling broadside to the waves. The study found that nothing can be done to keep the marked channel deep. Rather, the consultants recommended the placement of buoys in the naturally deeper channel as a navigational aid for larger boats. Smaller boats can continue to use the more shallow channel. The town has asked the Coast Guard to install additional channel markers.

With a more thorough understanding of its coastal problems and processes, the town is better prepared to make knowledgeable coastal management decisions in the future.

HYANNIS: Designs for Village Green

Hyannis is the major commercial center for Cape Cod. Its shops, restaurants, boating facilities, ferry connections to Martha's Vineyard and Nantucket, and hospital and professional services, draw thousands of people on a typical summer day. While Hyannis experienced rapid growth during the 1970's, much of the development occurred away from the downtown center. For example, a major suburban shopping mall was developed two miles away. Downtown commercial property deteriorated as retail business moved from the town center. The town began to lose its distinctive village character.

To reverse this trend, town planners and business people started to organize a Hyannis Revitalization Plan. The concept called for recreating a waterfront orientation for the village to stimulate economic revitalization of the downtown. A landscape architect was hired with CZM funds to develop a plan for Village Green.

The 12-member Barnstable Committee for Growth and Change, appointed by the selectman, worked with the planners and architects responsible for creating the plan. The Committee concentrated on:

- Village Green visual and physical access from Main Street to the waterfront.
- Main Street reorientation from car to pedestrian access.
- Increased emphasis of commercial fishing and recreational boating on the waterfront.
- Restoration of commercial property.

According to Planning Board Member Paul C. Brown, "The basic design of Village Green as the entrance to the *'Walk to the Waterfront,'* exemplifies a Victorian theme of color, night lighting, English Benches, and landscaping."

Implementation of the plan will cost some $200,000. The 1980 town meeting approved the creation of an Office of Community Development, which will coordinate the revitalization effort and raise the funds necessary to implement the plan. Fund raising is currently underway.

SANDWICH: Developing Plans for the East Boat Basin

The East Boat Basin in the Cape Cod town of Sandwich is a small man-made harbor opening onto the Cape Cod Canal. It is the town's only deep water port serving the needs of recreational boaters as well as commercial fishermen. Many facilities front on the canal, ranging from fish dealers and marinas, to fuel storage tanks, berthing areas, and picnic grounds. The East Boat Basin is the second largest

commercial fishing port on Cape Cod, with a wholesale landed value of $6 million annually. Fishermen, recreational boaters, and tourists have requested more space and facilities.

Sensitive to these needs, and planning for the future, the town purchased land to expand the harbor from 8 to 20 acres.

Sandwich received CZM funds to perform engineering and economic studies to develop detailed plans for this expansion, and hired an engineering firm to do the work.

The engineering firm offered several design alternatives; the town opted for separating recreational and commercial activities in an open basin plan for the harbor. The report included many detailed proposals, such as the design and location of new and expanded off-loading and berthing facilities.

The study also included a cost benefit analysis of the project. The estimated cost for harbor expansion was placed at $21 million. However, the cost to the town would be recouped through new income generated from berthing leases, boat taxes, and new business development.

The study met the town's needs. The engineering and economic justification will save the town up to two years in planning time. The study also provided the town with the necessary data for the Army Corps of Engineers, the managers of the Cape Cod Canal. The study provided Sandwich with the necessary tools to prepare for development. The Army Corps is presently working with the town and implementing the results of this CZM study.

BARNSTABLE: Study of Sandy Neck

Every aspect of coastal ecology is interrelated, and activities in one part of the coastal zone often have unanticipated effects elsewhere. The CZM-funded scientific study at Sandy Neck in Barnstable demonstrates their interrelationship.

Sandy Neck is a seven-mile-long barrier beach separating Barnstable Harbor and Cape Cod Bay. The beach is relatively undeveloped, and its marsh and sand dunes constitute important natural, recreational, and commercial resources. Sandy Neck is used by bathers, shell fishermen, hunters, beach buggies, picnickers, and naturalist study groups; its tidal flats are feeding ground for many shore birds. Northern Diamondback Terrapin live in the marsh and breed in the sand dunes along the beach. Once abundant in Massachusetts, these turtles are now afforded special status as a rare and threatened species.

To learn what threatened the turtles, and understand ways to protect them and their habitat, a project was initiated and directed by Peter Auger, a marine ecology teacher at Barnstable High School. Funds for the study were provided by CZM, as well as the Town Conservation Commission, the Massachusetts Audubon Society, and the Cape Cod Conservation District of the Soil Conservation Service. CZM funds allowed for the expansion of an on-going project. Altogether, 25 students and advisors participated in the study.

For over six months, the high school students monitored the life cycle of the turtles. They documented the terrapin's nesting cycle and habitat with field notes, photographs, and preserved specimens.

The study revealed that off-road vehicle traffic in certain sections of the barrier beach caused damage to both the beach and the turtles. A management program was proposed for rerouting and reducing vehicular traffic on the beach and dunes, replanting in bare dune areas, relocating a parking lot further behind the dunes, and improving enforcement of beach regulations. Arlene Wilson, former Barnstable Conservation Commission Chairman, reports that the new beach buggy trail proposed in the study has been built and "*95% of the traffic has been moved off the marsh road.*" A loose connection of trails has been transformed into one main trail for beach buggies and others. The Soil Conservation Service has planted beach grass around the new trail. Starting in the summer of 1980, a student who worked on the project patroled the beach as a conservation officer. Better beach management is already in place.

Through this study, the students acquired confidence and knowledge. Their photographs, studies, and specimens were added to the scientific collection at the Harvard University Museum of Comparative Zoology. Their findings were published in scientific journals, incorporated into local educational curricula, and used at public hearings. The students have given presentations to many community and educational groups. Several students involved in the project have graduated from high school, and are now majoring in environmental studies in college.

As a result of this and other studies, Governor Edward J. King issued an Executive Order in December 1980, mandating improved management of off-road vehicle use in sensitive state beach areas. Similar efforts are underway at the Cape Cod National Seashore. Through this careful and systematic evaluation of mans' impact on coastal ecology, important new management practices were developed and implemented.

Sandy Neck was later designed by the Secretary of Environmental Affairs as an Area of Critical Environmental Concern (ACEC). The Governor and the Town of Barnstable also established an independent Sandy Neck governing board to manage this fragile and sensitive barrier beach ecosystem.

SANDWICH/ BARNSTABLE: Management of the Beaches

The theme occurs often in the coastal zone — activities along one part of the shoreline often have unanticipated effects elsewhere. Such is the case with the beaches of Sandwich and Barnstable.

Historically, the Cape Cod Bay beaches of Sandwich and Barnstable have been supplied with sand from the cliffs west of the Cape Cod Canal. However, since construction of the canal and its jetties by the U.S. Army Corps of Engineers in 1930's, the beaches northwest of the canal have grown wider, and those on the southeast narrower. Changes are occuring so rapidly, in fact, that some coastal residents have been able to observe them. To better understand the causes of such extensive shoreline changes, the conservation commission and engineering departments of Sandwich and Barnstable initiated a CZM-funded study of their coast. A coastal geologist was hired to conduct a sand inventory of the beaches and dunes from Scusset Beach in Sandwich to Sandy Neck in Barnstable. The towns sought a management program to ensure better care of the beaches and a plan for monitoring future shoreline change.

The study concluded that beach erosion occurring approximately one mile east of the entrance to the Cape Cod Canal was caused by the Army Corps' protective jetties which trapped drifting sands and deposited

them in the canal. Sand also accumulated updrift of the canal. Without corrective action, the consulting geologist predicted that the area would enlarge and the "rate of required maintenance dredging within the canal could be expected to increase." The consultant recommended dredging sand at Scusset Beach northwest of the canal, and depositing dredge material on Town Beach southeast of the canal in order to reduce the amount of sand entering the canal. To prevent sand added to Town Beach from being swept into the canal by swiftly flowing currents around the southeast jetty, the scientist also recommended extending the canal jetty.

Corrective action for which Sandwich and Barnstable are responsible is limited to remedial beach nourishment. The U.S. Army Corps of Engineers is responsible for the larger task of dredging and maintaining the canal. As a result of the erosion study, the Corps now understands the problem and intends to take corrective action.

YARMOUTH: Callery/ Bass Hole Recreation Plan

It is rare for a town to appropriate a million dollars to buy a parcel of recreation and conservation land. But such was the case when the Cape Cod town of Yarmouth purchased the 260 acre *Callery Parcel* in North Yarmouth.

This rich and diverse land contains salt marshes, beach, and woodland. Existing facilities include a small marina and parking lot, restrooms, and a picnic area. A boardwalk crosses the marsh. However, the area contains no access trails, so most of the land remains unused.

Town committees and interested citizens saw the need to develop trails on this extraordinarily beautiful ocean shore property for nature walks and hiking. Many townspeople wanted the area developed to its full potential, so that it could be enjoyed for bass and bluefish fishing off Bass Hole, duck and goose hunting in the salt marshes, and seasonal pheasant, quail, and rabbit hunting in the uplands. The town obtained CZM financial support to develop plans and designs for trails and improved public access.

The town hired a landscape architect to develop detailed plan specifications. One recommendation called for redesigning, but only slightly expanding, the parking, boating, and beach facilities. Another recommendation called for developing two miles of trails through cranberry bogs and upland areas with views of pastures, ocean, shore, and village. The proposed design would avoid damage to the marshes and wildlife areas, and minimize disturbances to nearby residents. Construction costs of the Callery/Bass Hole Recreation Plan were estimated at $1,000.

Implementation has come slowly. Students from the local high school science department researched, cataloged and analyzed the plant and animal life of the area to develop educational materials for visitors. However, because some vandalism has already occurred in the boating area, residents in the surrounding area expressed concern for further trouble if the area is opened up as planned. The town is currently implementing the plan; at least one new trail will be completed in time for summer of '82 visitors.

YARMOUTH: A New Life for Wilber Park

Wilber Park in Yarmouth, a two- and one-half acre park on the Bass River, is used by residents for boating, fishing, picnicking, and swimming. For 15 years, the park has been unmanaged, poorly maintained, and over used. The river bank has badly eroded and become bare. Runoff and erosion have caused shoaling in the river, and now threaten the existence of nearby shellfish beds, a picnic site, and a boat launching ramp.

The town received a CZM grant to study the erosion problem and to develop a plan to improve and maintain the park. The town hired a landscape designer to prepare a master plan for the park. The architect's plan offered many recommendations, including building a new roadway away from the beach, constructing stairs and paths, installing new fencing, and building a bulkhead to stabilize the bank. The cost of the proposed work was estimated at $55,000.

The Yarmouth Town Meeting, on the recommendation of the Waterways Committee and the Parks Department, voted to approve the requested implementation funds. The project went out for competitive bid. Though bids were higher than anticipated, and the town was forced to scale down the plans, the project moved ahead and improvements were completed in 1981.

DENNIS: Sesuit Harbor Development Plans

The coastline of the mid-cape town of Dennis meanders for some 30 miles, encompassing marshes, barrier beaches, and developed areas. Like all Cape Cod towns, the population has increased dramatically in the last ten years. Pressure to build and develop is intense. This is particularly true around Sesuit Harbor, one of the relatively few harbors on the north side of the Cape.

Salt marsh vegetation rims the inner harbor. The water quality of the harbor remains high. However, sand dunes along the shoreline are losing vegetation, and Sesuit Creek no longer serves as a herring run.

Development in Sesuit Harbor has increased in recent years. Marinas, boat landings, slips, docks, and a parking lot are located on the west side of the harbor. The basin and anchorage are crowded. Demand exists for more facilities for fishing, boating, swimming, and sightseeing.

In 1958, the harbor was dredged and enlarged, and the breakwaters protecting the harbor extended. The harbor needs dredging again.

Dredging, building, and other improvements require permit approval from the Dennis Conservation Commission. In response to development pressures, the Conservation Commission decided to postpone permit approvals until they had a good harbor master plan to guide their decisions.

CZM provided the town with enough funding to prepare a preliminary plan and set of working maps of the harbor. A planning consultant was hired to work on the plan. Interested town officials, businesspeople, and residents worked together with consultants on the project.

The final plan contained many recommendations. Various elements of the plan call for dredging of the harbor, replacing and expanding docks, slips, and related marine facilities, and expanding parking lots. Other recommendations call for improving and increasing commercial space for marine businesses, and developing public walkways and scenic overlooks.

The conservation commission has found the plan clear and simple. Implementation is already underway. The harbor

has been dredged, and following up on a plan recommendation, construction of a dock for commercial fishing vessels is in the planning stages.

With the Sesuit Harbor Development Plan in hand, the conservation commission has a guide for making decisions and granting permits. According to town officials, development may proceed as long as it fits within the long range plans and perspectives established by the town in its harbor master plan.

HARWICH: Wychmere and Saquatucket Harbors

It may not resemble the State of Maine, but Cape Cod's Harwich has the largest offshore lobster business of any harbor in Massachusetts. Fishermen land some $3 million worth of lobster annually. Located on the Cape's southern side, Harwich has three protected harbors. Growing fishing and tourist industries have led fishermen and others to pressure town officials for improved and expanded harbor facilities. The town responded by asking CZM for technical assistance to determine which harbors in town contained the best potential for expansion. CZM suggested that Wychmere and Saquatucket Harbors held the best prospect because they were already developed and could be expanded with minimal environmental impact. With this information in hand, the town requested CZM grants to plan for the improvements.

Storm damage in Wychmere Harbor had left Old Town Pier in poor condition, and the adjacent Pogey's Dock unusable. An engineering firm was hired to estimate the cost of removing the old pier, and to prepare engineering plans for a new pier. The public was involved in all aspects of the project.

The engineering consultant proposed several options, including construction of a new, pre-stressed concrete pier. The engineering firm's recommendations were quickly approved by the town at the annual town meeting. The study helped the town obtain $100,000 in Farmer's Home Administration financing to construct the new pier. CZM helped the town obtain state and federal permits for work in the harbor. After two years of active discussion, and much public participation, the construction of the pier was completed.

Before the new town pier at Wychmere Harbor was completed, Harwich embarked upon an even more ambitious plan for Saquatucket Harbor.

Saquatucket Harbor is a man-made harbor, dredged by the U.S. Army Corps of Engineers in 1970. Today, modern floating docks offer excellent facilities for recreational boaters. However, the docks are not adequate for the growing fishing and lobster fleets. More space is needed; part of the parking lot was identified by CZM as the best area for expansion.

The town initiated a three-phase study to determine whether harbor expansion for commercial fishing was economically and environmentally feasible. CZM funded the first phase — an economic analysis of the proposed harbor expansion. The analysis concluded that expansion was a good investment in the town's year-round economic base. The cost of pier and related construction was estimated at $4-5 million.

The New England Regional Commission funded the next phase — developing architectural and engineering designs for the

new docking area and off-loading facilities, and gathering supporting information.

The final phase — developing funding strategies and management plans for the facilities — is currently underway. Town meeting has endorsed all aspects of harbor expansion plans.

Harwich is taking the logical steps to ensure a financial return on its expanded commercial fishing activities. In addition to these studies, the town is looking at ways to develop specialty fish products and other fisheries-related industries, thus providing further employment opportunities in the future.

CHATHAM: Understanding the Shoreline

Learning to live harmoniously with the sea requires information about and sensitivity to natural processes. The outer Cape community of Chatham faces the Atlantic Ocean on the east, and Nantucket Sound on the south. Over the centuries, residents have learned much about the power and influence of wind, waves, currents, and tides. Periodic coastal storms serve as stark reminders of the power of the sea.

As a result of erosion, shoaling, and other problems, the town conservation commission proposed a study of the Nantucket Sound shoreline to better understand the area's natural history and existing conditions, and to examine better management techniques.

After 50 years of building structures such as groins and jetties, it became evident that these structures caused more damage to the shoreline than did natural forces. On the southern coast of the town, roads were washed away. A large marsh began to die. Serious erosion developed in areas adjacent to groins. In one instance, a portion of the shoreline migrated 30 feet in 1979 alone.

Despite strong local zoning bylaws prohibiting development in wetlands, many new homes had been built on upland areas adjacent to marshes, and on ocean banks and bluffs. Some of these homes were vulnerable to the power of the sea.

The town hired a team of coastal scientists to study the Nantucket Sound shoreline in Chatham and, a comprehensive analysis was prepared that included recommendations for improved management of coastal resources. The coastal scientists proposed prohibiting construction of more groins, seawalls, or homes in the most coastal hazard prone areas. In the case of a large, dying salt marsh, the scientists proposed reopening a local creek to ocean tides to flush, and thus save the marsh.

The Chatham shoreline project met many goals of the local conservation commission. The study helped to educate local citizens and officials about coastal processes. The study developed an excellent reference tool for determining locations for future development. It provided a historical perspective on the town's coastal problems. Finally, it helped establish more realistic expectations for coastal residents — shoreline migration has occurred in the past and will continue to do so in the future.

Long concerned with its extraordinary coastal legacy, Chatham has gained a better understanding of its coast as a result of this study. The town will continue to study the coastline to better understand their local environment, and to seek ways to live more harmoniously with the sea.

EASTHAM: Learning About the Coast

Nauset Beach, Salt Pond, Herring Pond, and First Encounter Beach — these names of the outer Cape Cod community of Eastham's shores and waterways reflect a rich history and lasting inheritance from native American Indians and early Puritan settlers. Eastham's residents still prize this rich coastal tradition, and like their predecessors, live closely with the sea.

However, modern Eastham has experienced rapid growth and change like all Cape Cod communities. Some town residents fear losing contact with their natural resources and traditions. To help citizens become more acquainted with the life and natural processes of their coastal areas, the Eastham Conservation Commission initiated a series of popular field trips.

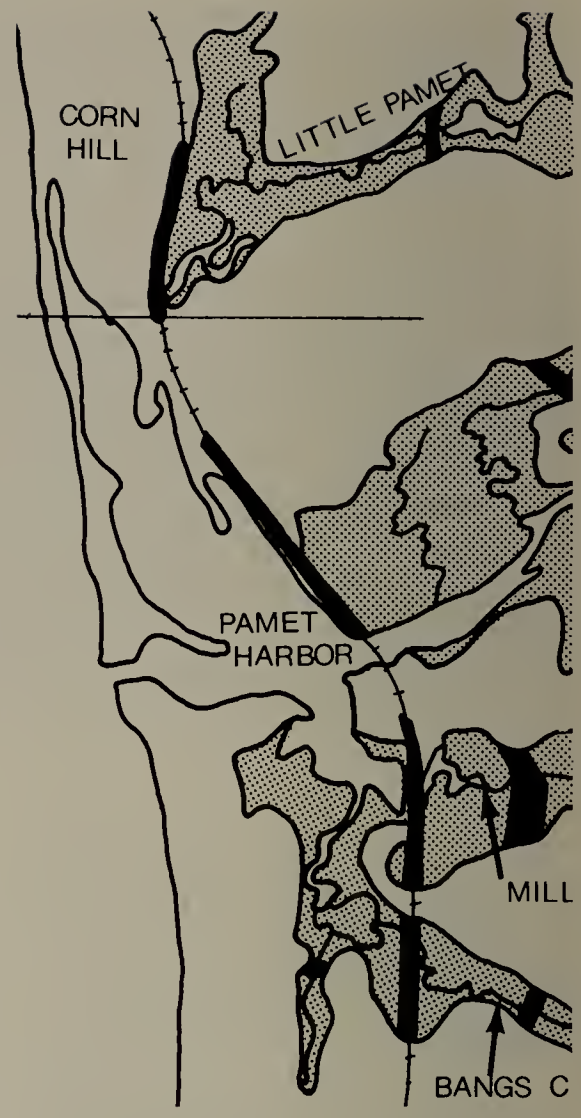
In 1979, using CZM funding assistance, the conservation commission expanded its outreach efforts. Local teachers and students developed a marine and coastal resources curriculum. A formal educational guide to town coastal resources was prepared. The school program included classroom work and a series of field trips to coastal beaches, coves, herring runs, salt marshes, and shellfish areas. On location, students and teachers studied subjects such as coastal ecology and geology.

Through the school program, students studied the many ways in which people depend upon the sea. They looked at the impact of human activities on the coastal environment. They visited a local fish market to explore fishing issues and the role of fish in the food chain. At one point in the project, the students constructed a model of a beach.

The educational program has applicability outside Eastham, as well. The marine education program was successfully presented in the Orleans public school. The educational guides have been distributed to other teachers and school systems, as well.

In addition to helping establish a school curriculum, the conservation commission organized a lecture series for adults on marine topics such as salt marsh ecosystems, barrier beach geology, and groundwater supply problems.

The project met many goals. It helped educate the next generation of Eastham about the wealth, diversity, and interrelatedness of the coastal environment. The students had an enjoyable learning experience, and educational materials useful in other coastal communities were produced.



TRURO: Improved Navigation of Pamet Harbor

On a typical summer day, sailboats and fishing boats can enter Pamet Harbor in Truro only at high tide, a period of about three hours a day. The harbor is shallow, and the inlet is badly shoaled. Sand accumulation is the natural result of long-shore sand drifts. However, the problem has been exacerbated by a series of dikes and jetties built over the past 100 years to control flooding. The northern jetty, for example, has obstructed the natural flow of sands to the town-owned Corn Hill Beach. To many

townspeople, building more structures and dredging more frequently appeared to be the only solutions. The Pamet Inlet was last dredged in 1969.

With CZM funding, the town initiated a study to better understand and control shoaling and erosion. The study was conducted by a team of coastal scientists working for a non-profit research center.

The scientists made several recommendations. A major recommendation called for dredging the harbor every five years. Sand shoals on the southern shore should be dredged and placed on eroding north shore to open the inlet and diminsh the amount of sand entering the harbor. In addition, the scientists recommended periodically opening the dikes to increase water flow in the harbor.

Other recommendations called for non-structural solutions to erosion problems. As a result of the scientist's proposals, for example, dune buggies have been prohibited from using the beach, and dune fencing has been installed in washover areas to help stabilize the shore.

The town has also established a ceiling on costs for harbor improvements. A U.S. Army Corps of Engineers study recommended spending five times what the town had in mind for building new protective structures and for dredging. The town is currently seeking funding for the dredging proposed by their coastal scientists. While no single step will solve Truro's shoaling and erosion problems, the town has already taken steps identified in the study to improve navigation in Pamet Harbor.

PROVINCETOWN: The Limits of MacMillan Pier

MacMillian Pier in Provincetown stands at the center of the town's maritime life. Approximately 1300 feet long, the pier supports several buildings and docking facilities for the community's commercial fishing, recreation, and tourist oriented economy. While all of these segments of the local economy demand more dock space, commercial fisheries led the way.

The 200-mile fishing limit, along with an increase in the U.S. per capita consumption of fish, has encouraged rapid growth of Provincetown's commercial fishing industry. The local fleet has grown from 20 vessels in 1970 to 57 today. The size of individual boats has increased as well. There is not enough room for all these boats today at MacMillan Pier, let alone in the years to come when much new growth is expected.

CZM partially funded a study evaluating ways to improve and expand MacMillian Pier. Public

participation was an important part of the study — a broad spectrum of harbor users worked with a consultant to assess town needs and the harbor's capacities for future expansion. The planners found that current use exceeds the engineering design capacity of the pier. They recommended up grading and expanding the pier, at a cost of $1.6-2.0 million. Improvements to the pier and other harbor actions could result in doubling the size of the local fleet and catch, and produce income growth of $9 million annually.

Immediately following the completion of this economic analysis, the town completed an engineering study of the pier. The study determined that the pier is not strong enough to allow for expansion and in fact, may be unsafe for current uses.

The town is now considering how to resolve the pier problem. Meanwhile, remedial measures to decrease stress on the pier, such as slowing traffic movement and requiring boats to *stand-off* during stormy weather, have already been instituted Further action will be taken as required to stabilize and repair the pier. Town Meeting authorized $200,000 for immediate stabilization measures. Once this is accomplished, the town will reconsider the feasibility of expanding the pier or constructing a new pier.

The combination of studies was fortuitous. By checking one another, the studies prevented the town from making an expensive error. The importance of sound planning and proper design and scheduling of studies became obvious as a result of this experience, and both Provincetown and CZM learned a lesson. However, these efforts were not in vain. Today Provincetown is reorganizing its harbor improvement strategies and building on the information and experience gained through the MacMillian Pier studies.

A 1982 Community Assistance Grant provides further assistance to the town in coordinating the recommendations for improving the rapidly deteriorating Town Pier. A Provincetown Harbor Development Committee comprised of local citizens and officials will be appointed to work with a part-time project coordinator to review and over see the development and coordination of a harbor management plan with MacMillan Wharf as the focus.

TISBURY: The Harbor at Vineyard Haven

Vineyard Haven in the town of Tisbury is the principal harbor and port of entry for the Island of Martha's Vineyard. It bustles with activity during the summer months as tourists arrive by ferry and recreational boats. Waterfront business sales total $24 million annually, and tourist services contribute $9.6 million in income to the town.

While the inner harbor is already crowded and highly developed, more facilities are needed. Fishing and fish wholesale operations require more space. Recreational boaters desire more moorings and docking space. The ferry company plans to increase its service, and expand its port facilities. Some people would like to see cleaner water so that shellfishing in the harbor will improve.

To meet these present demands, the Tisbury Planning Board organized a Waterways and Shores study project. With CZM funding, the planning board initiated a comprehensive study of the harbor to serve as a guide for future development, harbor improvements, and better management. During the study, water depths were measured, water movement analyzed, and uses and conditions of land and buildings inventoried. A set of detailed planning maps was produced. In addition, the planners prepared a report that detailed alternative options for meeting demands for new or expanded facilities.

Information in the report has already proved useful to the town. For example, the harbor inventory revealed that a proposed location for a new breakwater would not be suitable. Also, the town is seeking formal federal government *Port of Entry* status so that it will qualify for federal funding for future harbor development. With options and impacts established in the Waterways and Shores study, Vineyard Haven has the information to make better decisions concerning its future development.

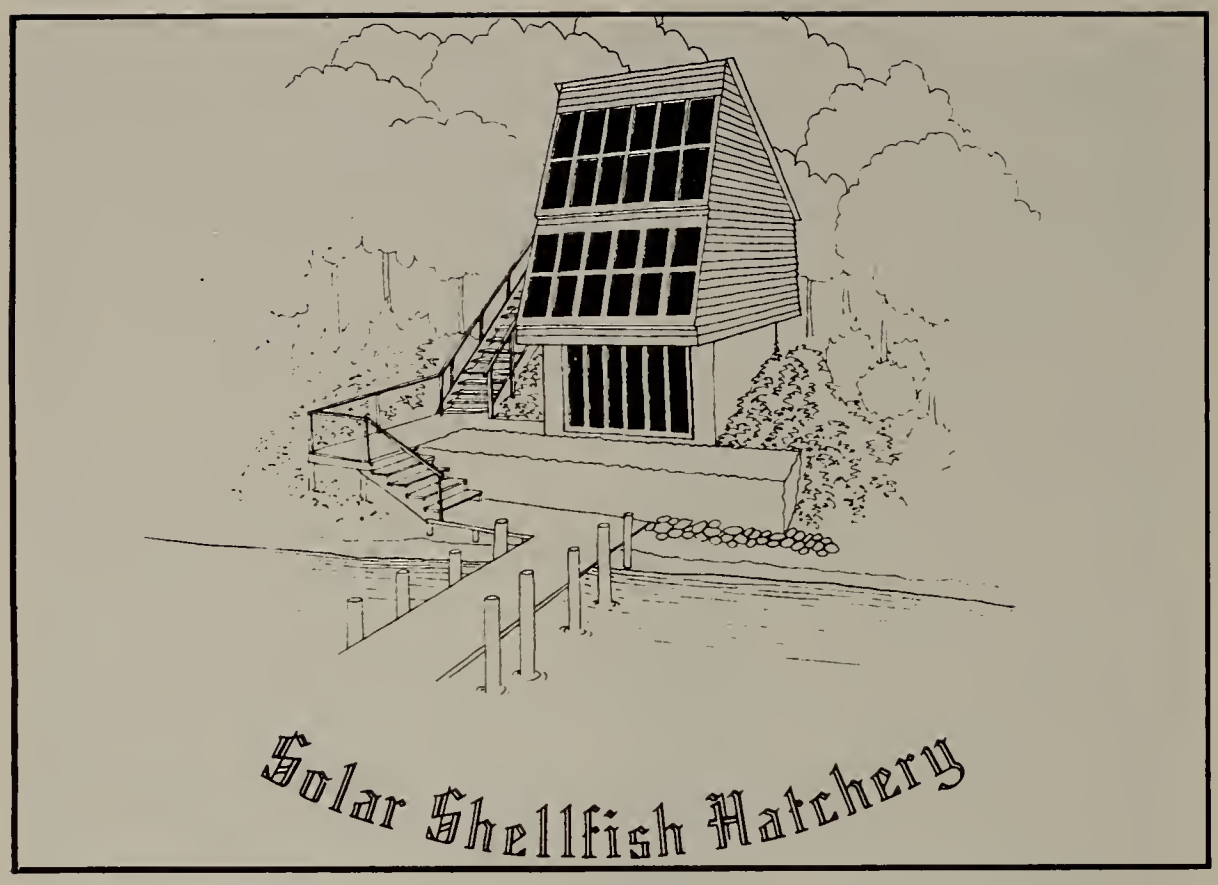
TISBURY AND OAK BLUFFS: Traffic Problems in the Ports

For the thousands of summer visitors who take the ferry to Vineyard Haven in Tisbury, or to Oak Bluffs, the start of a long-awaited vacation or retreat often begins with a traffic jam. Because narrow streets lead to the two ferry terminals, traffic congestion is a serious problem for these two ports. Development plans by the ferry operation to increase passenger and car capacity portend greater congestion — and delays — in the future.

The towns of Tisbury and Oak Bluffs together with the Martha's Vineyard Commission's Joint Transportation Committee sought to study current and potential future traffic problems at the island's ports of entry, and to make specific recommendations to improve street circulation, traffic control, and parking. CZM funded the traffic study.

In Oak Bluffs, town selectmen have already made use of plan recommendations to alleviate some traffic congestion. Circulation at a five-corner rotary has been improved by development of one-way streets. Tree planting, new street lights, and sidewalk improvements, have made the area more attractive, and added to the circulation improvements.

In Vineyard Haven, the problems are more severe. For years, Five Corners has been a traffic bottleneck for automobile travelers and pedestrians alike. An attempt to implement recommendations from the plan, and create a comprehensive one-way street pattern, led to loud protests from citizens and businesses. The town dropped many of the proposed changes. However, the town changed the traffic flow by making them one-way. Street signs were erected that directed visitors to the municipal parking lot and the Steamship Authority. Although the study revealed that adequate off-street parking existed, merchants objected to recommendations for parallel street parking because it would reduce parking near the stores. The report is controversial, and the town is still evaluating its options before attempting to implement other recommendations. Some controversy is healthy, though, and the project is resulting in constructive debate which will eventually lead to an acceptable solution.



MARTHA'S VINEYARD: Expansion of the Shellfishing Industry

To on-islanders and visitors alike, Martha's Vineyard is a quiet haven worlds away from the mainland. The island has its problems, however. Tourism provides 95% of Martha's Vineyard's economic base. Consequently, unemployment is high during offseason, and the island has the lowest per capita income in the state. Further, residents pay more than the state average for energy.

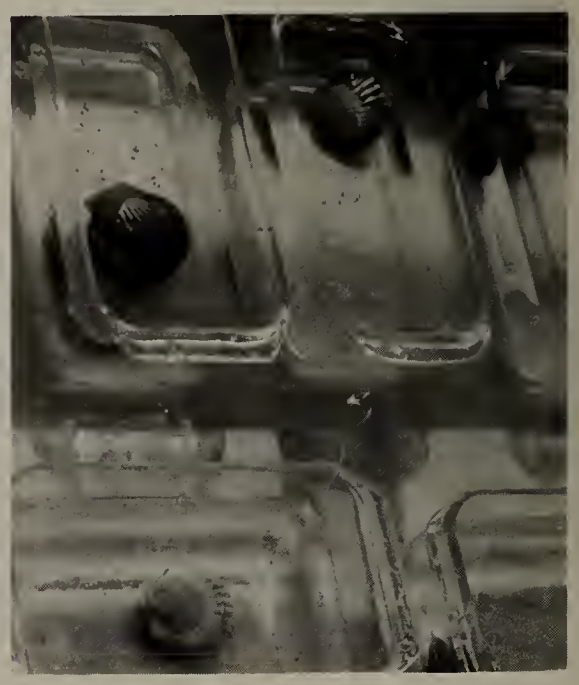
One way to even out the seasonal unemployment of the island and improve economic conditions is to develop a broader local industrial base. An expanded shellfish industry on the island was one such opportunity.

Martha's Vineyard has 10,000 acres of uncontaminated bays and ponds capable of producing far more quahaugs, scallops, clams, oysters and mussels than are presently harvested. The communities on the island decided to investigate the possibility of establishing a shellfish hatchery operation to increase the productivity of the Vineyard's water. In turn, shellfish packing, processing, marketing, and related activities would increase, help provide year-round jobs, and bring greater economic stability to the island.

The CZM grant was obtained by a non-profit municipal cooperative, the Martha's Vineyard Shellfish Management Group, sponsored by the Towns of Chilmark, Gay Head, Oak Bluff, Tisbury, and West Tisbury. The group had already successfully experimented with shellfish hatching and established the potential for largescale seeding and propagation. Now this local group of shellfish biologists and entrepreneurs saw potential for great savings by using solar energy in the energy intensive shellfish hatching industry.

The purpose of the CZM grant was to support further research and preliminary engineering designs for a solar assisted shellfish hatchery. The study was conducted and the design developed by the Energy Research Group of West Tisbury, The study reaffirmed the validity of the solar shellfish hatchery.

The Martha's Vineyard Shellfish Management Group subsequently obtained CZM Coastal Energy Impact Program (CEIP) funding to construct the solar-assisted shellfish hatchery. The hatchery is now in full operation. From its inception, the project received the support of the five Martha's Vineyard towns. The facility provides a reliable source of healthy seed grown on the island. Local shellfish budgets for seed stocks, once expended off-island, are now invested on-island. The facility



also provides a research and learning center which will assist local shellfish departments of the five member towns. Since shellfish beds in Massachusetts are public, the stocked beds are available for public use.

The hatchery was the first large construction project funded in the CEIP program, and the only federally-funded shellfish hatchery in the U.S. Its success is founded in strong local support and a commitment to the healthy future of Martha's Vineyard.

NANTUCKET: Renewed Ties to the Sea

During the early 19th century the port of Nantucket was one of the busiest and wealthiest in America. It even rivaled the port of New York. Much of the history and charm of the great clipper trade era lives on. The island has a unique architectural charm, signified by its grey weathered clapboard homes, picket fences, cobblestoned streets, and small, cozy guest houses. Today the wharf bustles with recreational boats, restaurants, and commercial fishing boats.

However, growth pressures threaten the very character Nantucket has struggled to preserve. Tourism is the Island's prime industry — a half million tourists visited in 1981. Their numbers continue to grow, along with support services. For example, in the past 8 years, the number of restaurants serving tourists has increased from 25 to 81. Another important industry is seasonal and year-round home building, and it is booming. Over 160 new homes were built in 1979, and the Island is experiencing a new phenomenon: suburban sprawl. However, building growth can not last forever on this 6-by-13-mile island. Despite its growth and appearance of wealth, island income levels are low, and seasonal unemployment is high. Nantucket must improve its economic base and develop more constant, durable industries. An obvious source of jobs and income is the sea.

Nantucket was once a thriving fishing center and home port to some 60 fishing boats. Business migrated to New Bedford in the 1930's, and in 1978 the fleet contained only 7 large vessels. Their combined 1978 catch was worth $1.6 million. Nantucket is the closest U.S. possession to one of the richest fishing grounds in the world, Georges Bank. The island's offshore commercial fishing fleet has not increased in size in part because onshore facilities are too limited for an expanded fishing industry. Fuel costs are high, ice-making

capabilities meager, and marine repair businesses and services nonexistent for commercial boats. The island does not have adequate dockage for commercial vessels. Large investments would be needed to redevelop this industry.

A CZM-funded study was undertaken by the Nantucket Planning and Economic Development Commission to determine whether Nantucket should revive fishing as a major industry. The analysis included a review of existing and potential levels and types of fishing, facility needs, and possible site locations for a new commercial wharf. The report concluded that redevelopment of the fishing industry represents the best prospect for new long-term economic development.

Great strides in Nantucket's fishing industry are occurring, many as a result of the project. With CZM support, a subsequent study investigated marketing opportunities, and funded the development of preliminary design for a new fishing wharf. The fishing fleet has recently gained five new vessels. Old, forgotten fishing skills are being taught to a new generation through a marine vocational program in the local schools. The spirit of renewed interest in Nantucket's fishing industry is most clearly reflected in the new, annual *Nantucket Seafest*. This country fair with a sea theme, organized by the planning commission, yearly draws 5000 people together to celebrate Nantucket's past, present, and future ties to the sea.

Project Summary of Community Grants Assistance Program

Port/Harbor Development, or Waterfront Renewal Plans

Beverly: Continue harborfront improvement studies to provide additional information for a waterfront redevelopment plan. Special emphasis to be placed on waterfront housing development and improved public access.
Boston — Boston Redevelopment Authority: Investigate the regulation and uses of urban marinas and live-aboard boat residents. Special attention given to alternative solutions to the problems of safety, zoning, sewerage, and the economic costs and impacts and other sociometric factors generated from house boats and other types of floating homes.
Dennis: Prepare a preliminary master plan for Bass River, to help guide future development.
Harwich: Compile the data and information required for seeking public funding for expansion of commercial fishing facilities in Saquatucket Harbor. This grant represents the final phase of a three part study.
Marblehead: Prepare a waterfront management plan for maintaining a balance of mixed uses compatible with the historic significance, economic base, and aesthetic appearance of the Marblehead waterfront. Maintain and increase access to the waterfront.
Nantucket: Prepare an economic, environmental, and engineering feasibility analysis of fishing industry redevelopment on Nantucket Island. This is the final phase of a two part study.
Oak Bluffs: Prepare a waterfront renewal plan for bulkhead and seawall reconstruction, and recreational needs including potential acquisition.
Southeastern Regional Planning and Economic Development District (SRPEDD): Evaluate the needs for and potential development of harbor pump-out facilities in Mt. Hope Bay and Buzzards Bay communities, to meet state and federal standards.

Dredge or Dredge Disposal Demonstration Projects

Bourne: Prepare engineering plans to aid channel improvement dredging in Redbrook Harbor, Phinneys Harbor, and Little Bay.
Danvers: Prepare engineering plans to aid channel improvement dredging in Danvers Harbor, and the Porter and Crane Rivers.
Rockport: Prepare engineering plans to aid channel improvement dredging in Pigeon Cove.

Recreation Plans

New Bedford: Prepare an economic and engineering feasibility study for a recreational marina on Popes Island in New Bedford Harbor.
Somerset: Develop a recreation master plan for *The Bluffs* beach area. Analyze erosion abatement alternatives.

Demonstration Projects for Mitigation of Coastal Hazards

Dennis/Yarmouth: Prepare a study of the shoaling problems at the mouth of the Bass River.

Preliminary Engineering Studies

Gay Head: Prepare a preliminary engineering feasibility study for dredging and bulkhead construction in the West Basin area.

Applied Science Studies

Barnstable County (A joint project with U. Mass. and County Extension Service): Prepare a multi-media slide program on coastal erosion, groundwater, shoreline processes, land use, barrier beaches, and coastal hazards, for use by public agencies and organizations on Cape Cod. The slide show material is to be developed for both adults and children.
Braintree: Study and evaluate the sources of erosion, siltation, and pollution in the Monatiquot/Fore riverine systems, with the goal of alleviating sedimentation problems.
Ipswich: Perform a study of the *red tide* paralytic shellfish poisoning in Plum Island Sound and adjacent areas.
Salisbury/Newburyport: Assess the water quality in the Merrimack River estuary, and evaluate its quality for potential clamming industry redevelopment.
Yarmouth: Prepare a scientific analysis of shoaling problems in the Mill Creek Basin. The study represents one element of a recreation master plan for the area.

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